U.S. Census Bureau Methodological Changes
Centers for Disease Control and Prevention

October 17, 2023

Outline

Changes to….

- Geography

- Race and Ethnicity

- Population Estimates
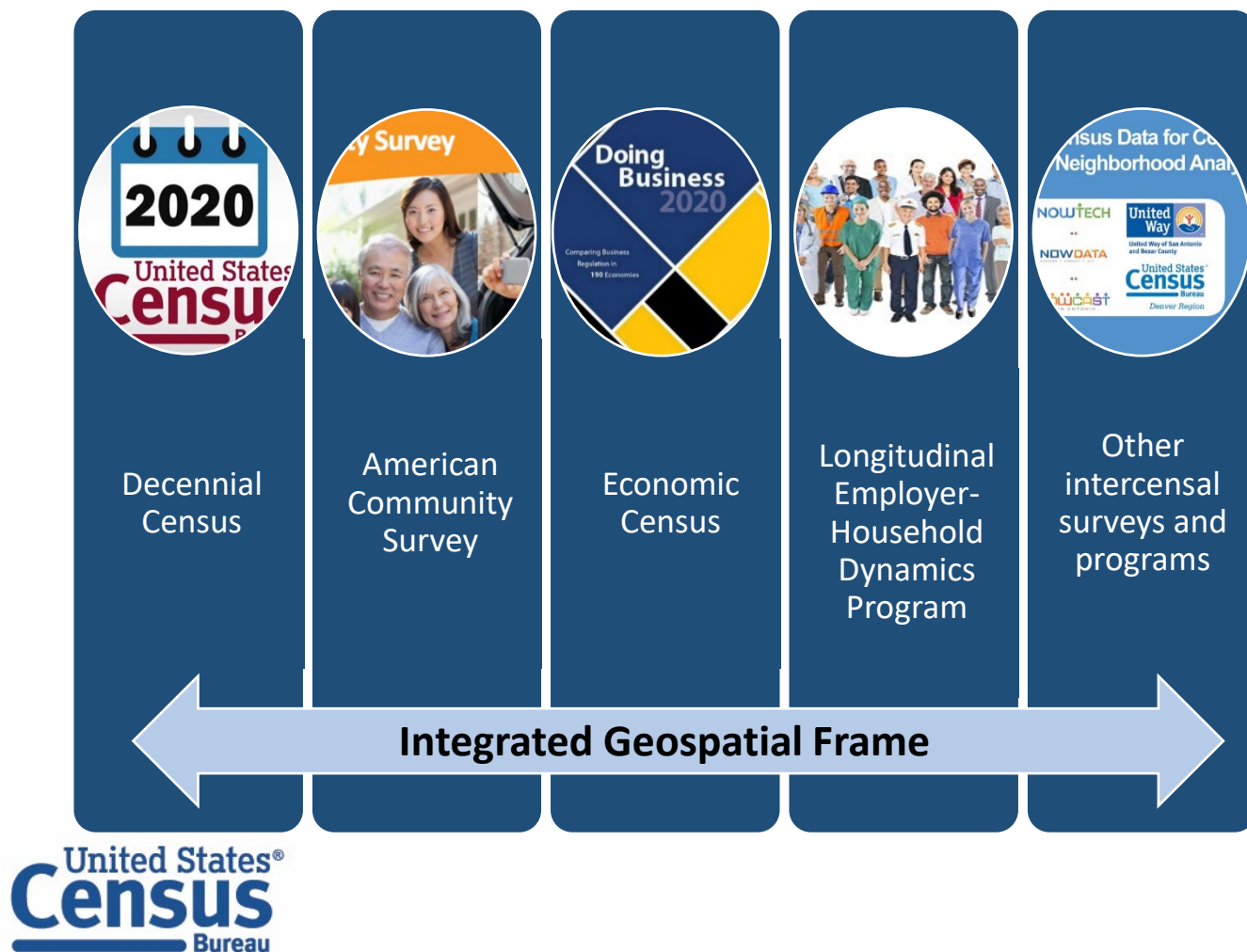
- American Community Survey

- Disclosure Avoidance

Geographic Changes

October 17, 2023

Nathan Jones
Assistant Division Chief, Geography Division

Geography

Geography is the foundation for Census Bureau programs

Integrated Geospatial Frame

Decennial Census

American Community Survey

Economic Census

Longitudinal Employer-Household Dynamics Program
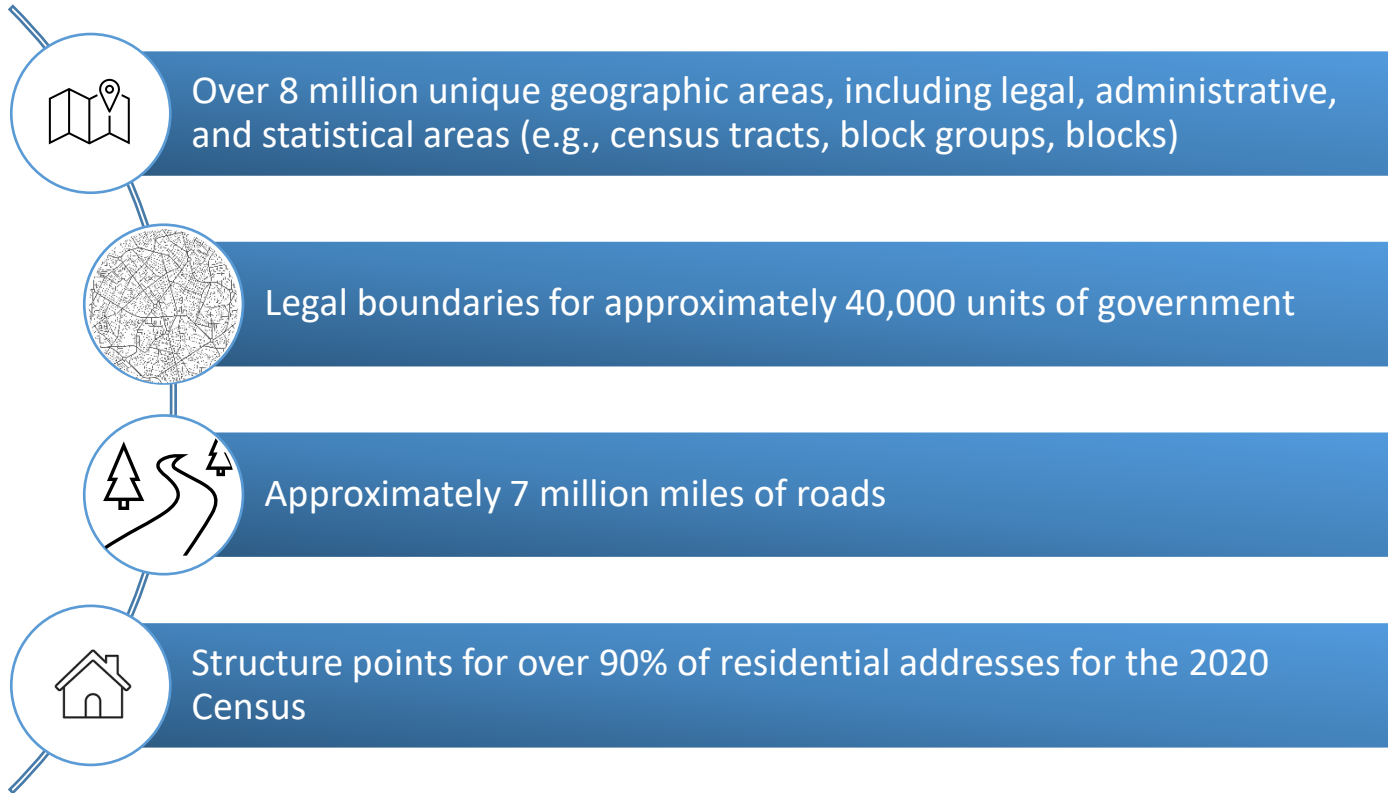
Other intercensal surveys and programs

Census Bureau programs

- Decennial Census
- American Community Survey
- Economic Census
- Longitudinal Employer-Household Dynamics (LEHD) Program
- Other intercensal demographic and economic statistical programs:
  - Current Surveys
  - Population Estimates Program
  - Small Area Income and Poverty Estimates
  - Building Permit Survey and Survey of Construction
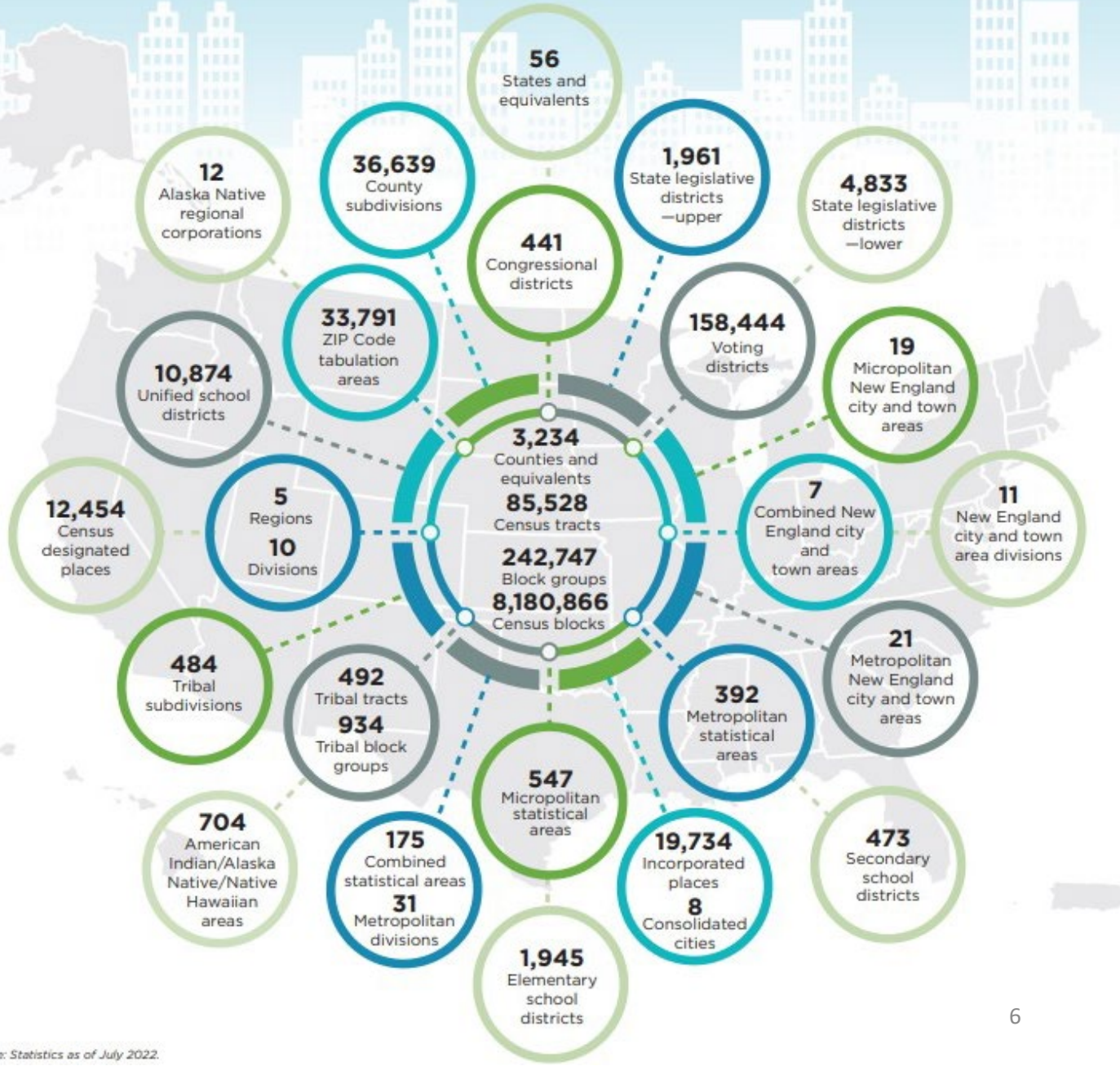 - Trade in goods

Geography

The magnitude of our geospatial information enables work at the
Census Bureau – and across government, the private sector & academia

Geospatial information in our MAF/TIGER System includes…

Over 8 million unique geographic areas, including legal, administrative, and statistical areas (e.g., census tracts, block groups, blocks)

Legal boundaries for approximately 40,000 units of government

Approximately 7 million miles of roads

Structure points for over 90% of residential addresses for the 2020 Census

2020 Geographic Entities for the United States, the District of Columbia, Puerto Rico, and the Island Areas

56 States and equivalents

12 Alaska Native regional corporations

36,639 County subdivisions

1,961 State legislative districts —upper

4,833 State legislative districts —lower

441 Congressional districts

33,791 ZIP Code tabulation areas

158,444 Voting districts

19 Micropolitan New England city and town areas

10,874 Unified school districts

3,234 Counties and equivalents
85,528 Census tracts
242,747 Block groups
8,180,866 Census blocks

5 Regions
10 Divisions

7 Combined New England city and town areas

11 New England city and town area divisions

12,454 Census designated places

484 Tribal subdivisions

492 Tribal tracts
934 Tribal block groups

392 Metropolitan statistical areas

21 Metropolitan New England city and town areas

704 American Indian/Alaska Native/Native Hawaiian areas

175 Combined statistical areas
31 Metropolitan divisions

547 Micropolitan statistical areas

19,734 Incorporated places
8 Consolidated cities

473 Secondary school districts

1,945 Elementary school districts

Note: Statistics as of July 2022.

Legal and Administrative

Geographic areas that generally originate from legal actions

Names and boundaries are defined in official documentation

Usually represented by elected government officials

Can evolve over time through legislation

Delineated for the purpose of administration of an activity or governmental program

Statistical

Geographic areas created by the Census Bureau and other stakeholders for data tabulation and presentation purposes

Can provide coverage in areas where legal and administrative entities are incomplete or nonexistent

Do not require official legislation for their creation

Not usually represented by government officials or stakeholders

Can evolve over time from practice, custom, usage, or need

Census Bureau Geographic Entity Tallies:

<https://www.census.gov/geographies/reference-files/time-series/geo/tallies.html>

Geography
Partnership Programs

- The Census Bureau conducts the following partnership programs throughout the decade to maintain the accuracy of its inventory of addresses and boundaries:
  - Boundary and Annexation Survey – Annually.
  - School District Review Program – Annually.
  - Participant Statistical Areas Program - Once-a-decade.
  - Redistricting Data Program – Five phases conducted throughout the decade.
  - Local Update of Census Addresses Operation – Once-a-decade.
  - New Construction Program – Once-a-decade.

Geography

Recent Significant Changes – State of Connecticut

- At the request of the State of Connecticut, the Census Bureau adopted the State's 9 planning regions as County-equivalent geographic units in 2022 for:
  - Data Collection.
  - Data Tabulation.
  - Data Dissemination.
- The State's 9 planning regions replace 8 counties which ceased to function as governmental and administrative entities in 1960.
- More information on this change is available at:
  - Federal Register :: Change to County-Equivalents in the State of Connecticut
  - Final Changes to County Equivalents in Connecticut (census.gov)
  - Changes to Counties and County Equivalent Entities: 1970-Present (census.gov)
  - CT Planning Regions Approved to Become County Equivalents (arcgis.com)

Geography

Recent Significant Changes – 2023 Boundary and Annexation Survey

- Through the 2023 Boundary and Annexation Survey (BAS), the Census Bureau received >30,000 legal boundary updates updates from > 3,000 *participating Tribal, State, County, and Local Governments*.

- The next release of the Census Bureau's TIGER/Line shapefiles will include 5,475 legal changes submitted through the 2023 Boundary and Annexation Survey. This includes annexations, deannexations, incorporations, and disincorporations.

- Governments will receive invitations to participate in the 2024 BAS beginning in January.

Examples of Tribal and Non-Tribal Census Bureau Geographies

County or Equivalent Entities

Definition	• The primary divisions of states or equivalents
Legal/Administrative or Statistical	• Legal
Nesting Relationship	• Nest within states
Coverage	• Continuous
History	• Maintained since the first census occurred in 1790
Created By/Parties Involved	• State governments
Creation Criteria	• Pursuant to state law
Updates	• Boundary and Annexation Survey (BAS)
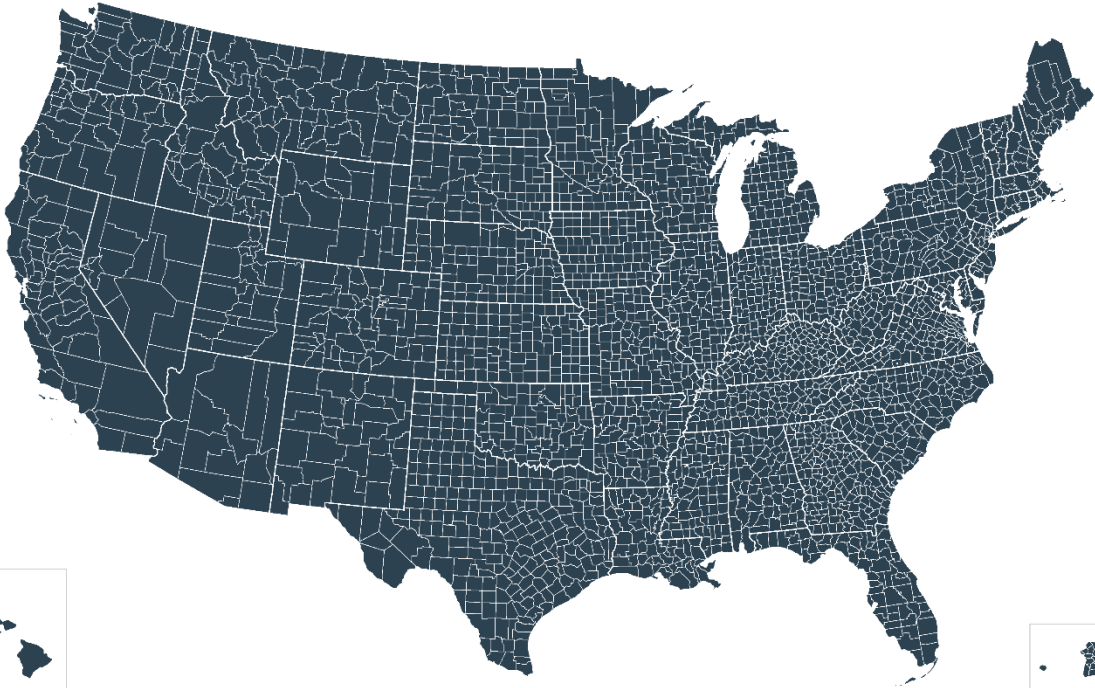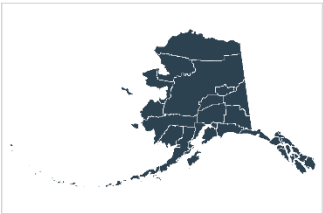
Minor Civil Divisions (MCD)

Definition	• The primary governmental or administrative divisions of a county in many states
Legal/Administrative or Statistical	• Legal
Nesting Relationship	• Nest within counties
Coverage	• Occur in 29 states • Complete coverage within those states
History	• Maintained since the first census occurred in 1790
Created By/Parties Involved	• Pursuant to state and county law
Creation Criteria	• Legally defined • Provides nearly complete coverage • Geographic stability
Updates	• Boundary and Annexation Survey (BAS)
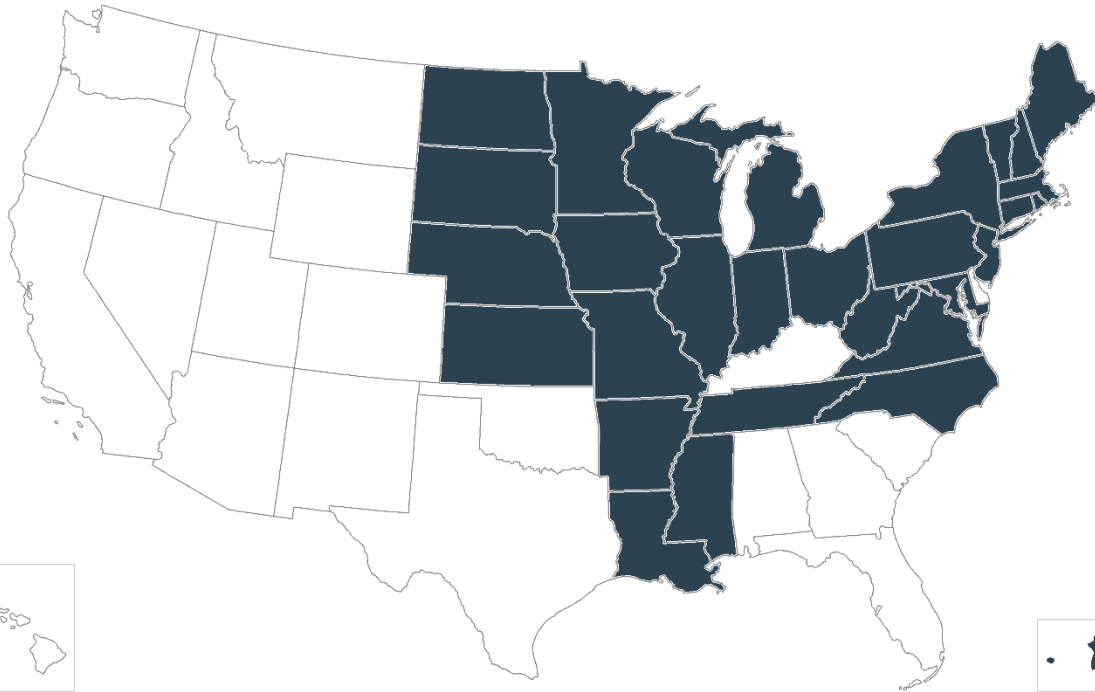
MCD States

Incorporated Places

Definition	• A type of governmental unit, incorporated under state law as a city, town (except in New England, New York, and Wisconsin), borough (except in Alaska and New York), or village, having legally prescribed limits, powers, and functions
Legal/Administrative or Statistical	• Legal
Nesting Relationship	• Nest within states
Coverage	• Discontinuous
History	• Maintained since the first census occurred in 1790
Created By/Parties Involved	• State governments
Creation Criteria	• Legally defined
Updates	• Boundary and Annexation Survey (BAS)
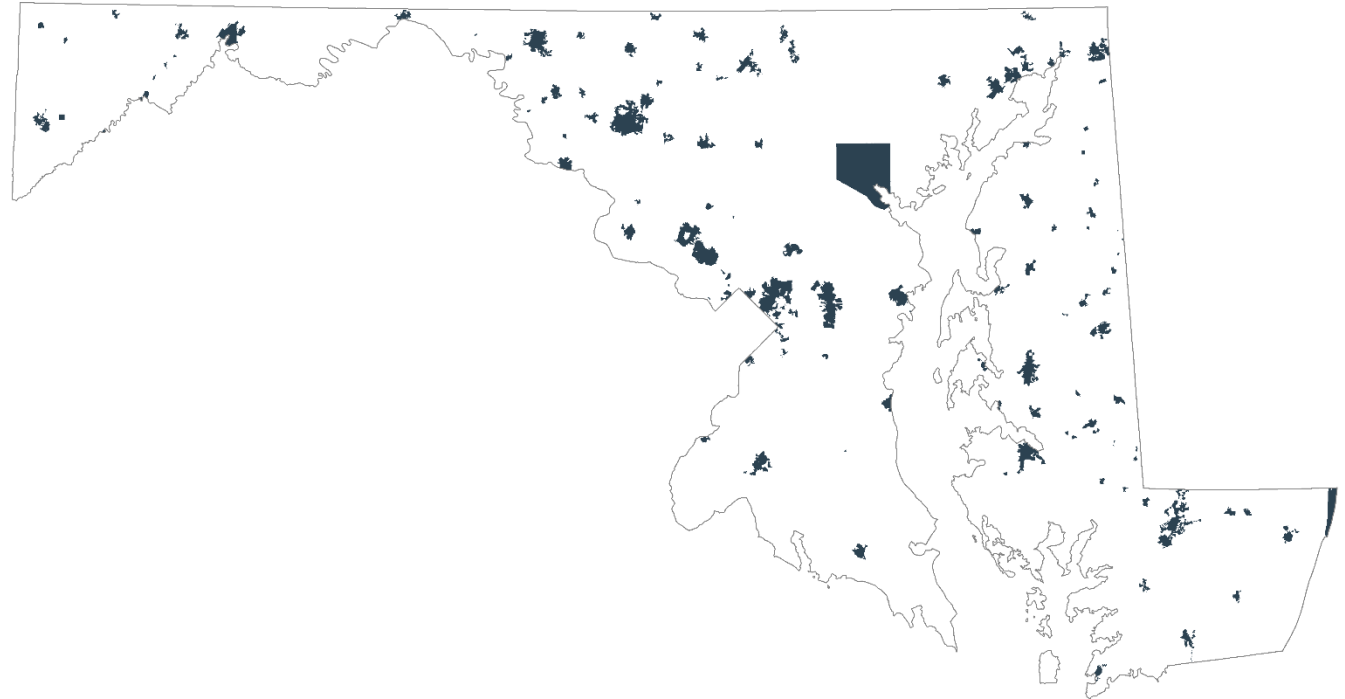
Census Tracts

Definition	• Small, relatively permanent statistical subdivisions of a county or equivalent entity that are updated by local participants
Legal/Administrative or Statistical	• Statistical
Nesting Relationship	• Nest within counties
Coverage	• Continuous
History	• 1910 - 8 cities • 1930-1960 - expansion to additional cities and then all metropolitan counties • 2000 - continuous coverage across the nation
Created By/Parties Involved	• State and local partners, generally county or regional planning agencies, following Census Bureau criteria and guidelines

	Min	Optimum	Max
Creation Criteria	Pop: 1,200	Pop: 4,000	Pop: 8,000
	Housing: 480	Housing: 1,600	Housing: 3,200

Updates	• Participant Statistical Areas Program (PSAP)
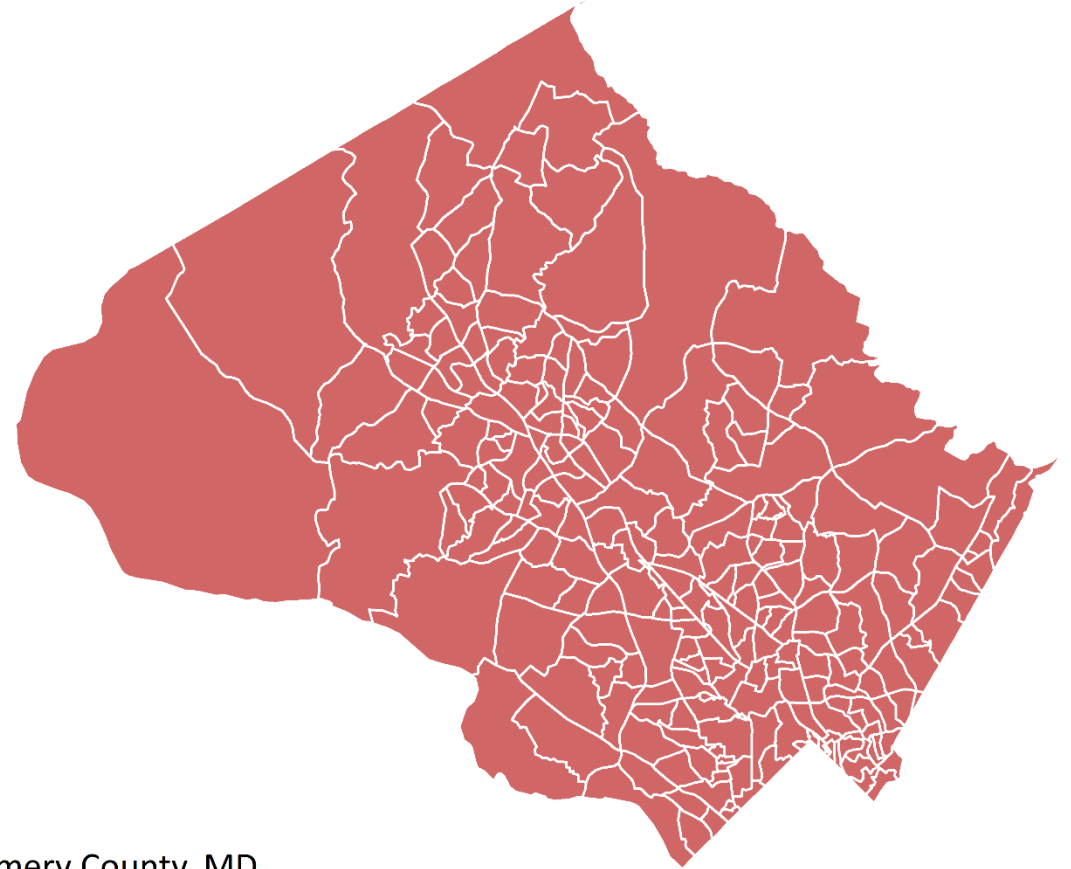
Montgomery County, MD

Census Blocks

Definition	• Statistical areas bounded by visible features, such as streets, roads, streams, and railroad tracks, and by nonvisible boundaries, such as selected property lines and city, township, school district, and county limits and short line-of-sight extensions of streets and roads
Legal/Administrative or Statistical	• Statistical
Nesting Relationship	• Nest within block groups
Coverage	• Continuous
History	• 1940 - blocks were introduced in limited areas • 1980 - large cities and selected states • 1990 - continuous coverage across the nation
Created By/Parties Involved	• Census Bureau
Creation Criteria	• Roads, rivers, and other visible features • All higher level geographic entity boundaries
Updates	• Block Boundary Suggestion Program (BBSP) • BBSP is Phase 1 of the 2020 Census Redistricting Data Program

Montgomery County, MD

United States Census Bureau
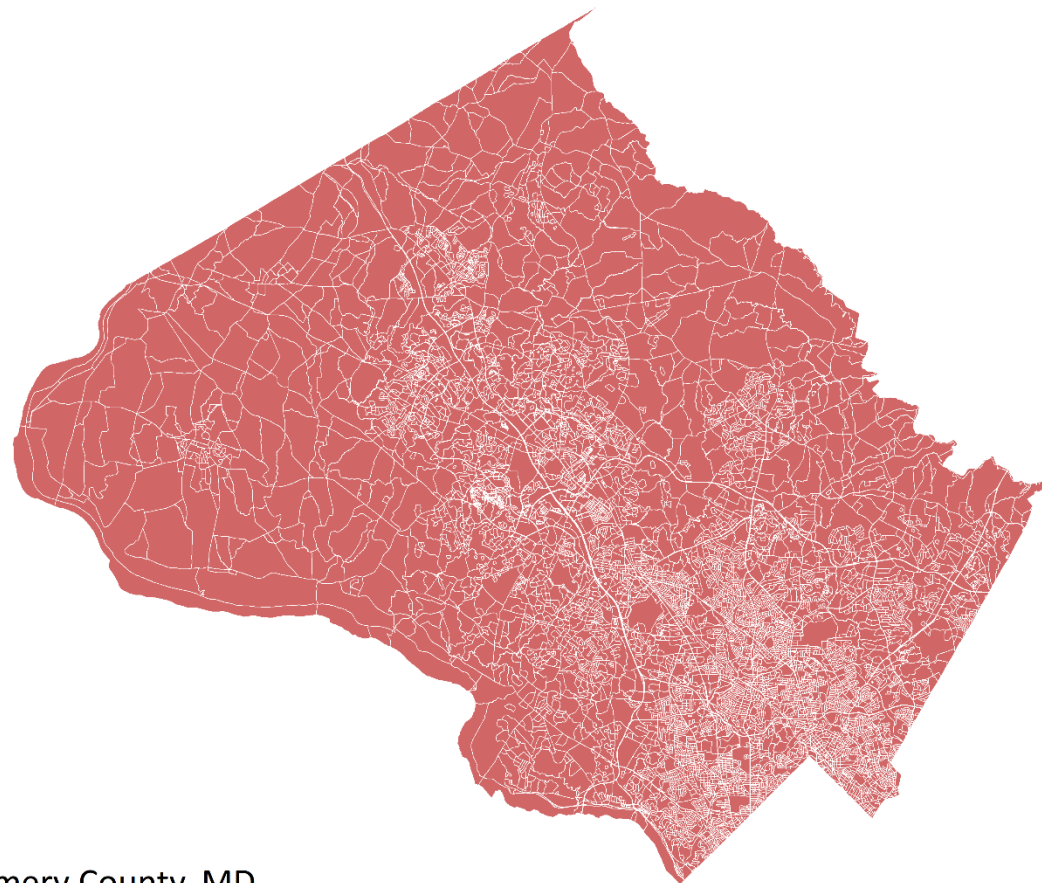
American Indian Area (AIA)

Definition	• Areas that have been set aside by the United States for the use of tribes
Legal/Administrative or Statistical	• Legal • Statistical
Nesting Relationship	• Within the nation
Coverage	• Discontinuous • Does not include Alaska Native or HHL Areas
History	• 1860 was the first census that American Indians living on tribal lands in the western half of the United States were enumerated as a unique population group
Created By/Parties Involved	• Tribal treaties, agreements, executive orders, federal statutes, secretarial orders, or judicial determinations
Creation Criteria	• Each specific AIA type has its own criteria
Updates	• Boundary and Annexation Survey (BAS) • Participant Statistical Areas Program (PSAP)
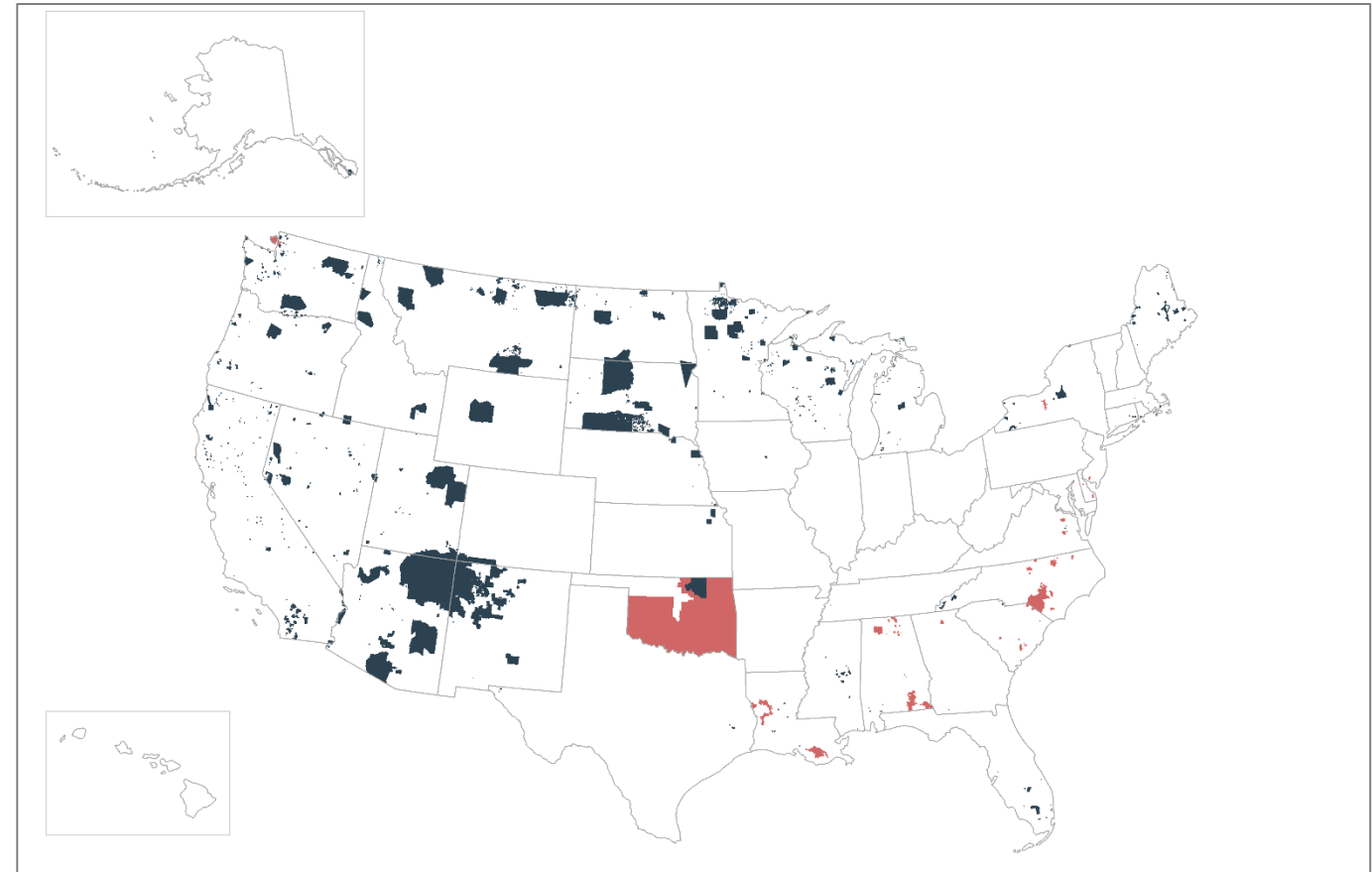
Geospatial Products

Additional Resources for Products
TIGER/Line Shapefiles (census.gov)
TIGERweb (census.gov)
2023 BAS Partnership Shapefiles (census.gov)
Census Mapping Files
Census Reference Maps
Cartographic Boundary Files (census.gov)

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Additional Resources

Additional Resources
Census Code Lists (FIPS, FUNCSTAT, MTFCC, LSAD)
Census Geography - History
Federal Register Notices - Geographic Areas and Partnership Programs
Geographies (census.gov)
Urban and Rural
Legal/Administrative and Statistical Geographic Entities
Geographic Support Program - Strategic Plan -- Fiscal Year 2022 Through Fiscal Year 2026 (census.gov)

Improvements to the 2020 Census Race and Hispanic Origin Question Designs, Data Processing, and Coding Procedures
(2020 Census and American Community Survey)

October 17, 2023

Alli Coritz
Senior Analyst, Racial Statistics Branch

United States® Census Bureau

2020 Census

Separate Ethnicity Question

→ NOTE: Please answer BOTH Question 6 about Hispanic origin and Question 7 about race. For this census, Hispanic origins are not races.

6. Is this person of Hispanic, Latino, or Spanish origin?

☐ No, not of Hispanic, Latino, or Spanish origin

☐ Yes, Mexican, Mexican Am., Chicano

☐ Yes, Puerto Rican

☐ Yes, Cuban

☐ Yes, another Hispanic, Latino, or Spanish origin – *Print, for example, Salvadoran, Dominican, Colombian, Guatemalan, Spaniard, Ecuadorian, etc.* ⬓

- Question designs for 2020 Census adhere to 1997 OMB standards for race and ethnicity.

- The Census Bureau did not use combined question format for collecting race and ethnicity.

- 1997 OMB standards require two separate questions for self-response.

- "Middle Eastern or North African" (MENA) category not used, but detailed MENA responses collected.

- Significant changes from 2010 Census questions for race and ethnicity.

Separate Race Question

7. What is this person's race?
Mark ☒ one or more boxes AND print origins.

☐ White – *Print, for example, German, Irish, English, Italian, Lebanese, Egyptian, etc.* ⬓

☐ Black or African Am. – *Print, for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somali, etc.* ⬓

☐ American Indian or Alaska Native – *Print name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.* ⬓

☐ Chinese   ☐ Vietnamese   ☐ Native Hawaiian
☐ Filipino   ☐ Korean   ☐ Samoan
☐ Asian Indian   ☐ Japanese   ☐ Chamorro
☐ Other Asian –   ☐ Other Pacific Islander –
Print, for example,   *Print, for example,*
Pakistani, Cambodian,   *Tongan, Fijian,*
Hmong, etc. ⬓   *Marshallese, etc.* ⬓

☐ Some other race – *Print race or origin.* ⬓

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Improvements to the 2020 Census Race Question

- Write-in response areas were added for the White and Black or African American racial categories.

- Six examples were provided for each of the write-in fields allocated to the "White," "Black or African American," and "American Indian or Alaska Native" groups.

- The category "Black, African Am., or Negro" was changed to "Black or African Am." on paper.

- The detailed Asian and Native Hawaiian or Other Pacific Islander checkboxes were re-ordered by population size.

- The checkbox category "Guamanian or Chamorro" was changed to "Chamorro."

- The write-in instructions for the "Some Other Race" category were updated to "Print race or origin."

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7. What is this person's race?
Mark ☒ one or more boxes AND print origins.

☐ White – *Print, for example, German, Irish, English, Italian, Lebanese, Egyptian, etc.* ⬋

☐ Black or African Am. – *Print, for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somali, etc.* ⬋

☐ American Indian or Alaska Native – *Print name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.* ⬋

☐ Chinese   ☐ Vietnamese   ☐ Native Hawaiian
☐ Filipino   ☐ Korean   ☐ Samoan
☐ Asian Indian   ☐ Japanese   ☐ Chamorro
☐ Other Asian – *Print, for example, Pakistani, Cambodian, Hmong, etc.* ⬋   ☐ Other Pacific Islander – *Print, for example, Tongan, Fijian, Marshallese, etc.* ⬋

☐ Some other race – *Print race or origin.* ⬋

How Data on Hispanic Origin and Race are Processed and Coded in the 2020 Census Compared to the 2010 Census

2010 Census

- Limited to coding two write-in responses and 30 characters per write in line.
- Due to the limit, in the Hispanic origin question, Hispanic origin responses were prioritized over race responses.
- Due to the limit, in the race question, race and tribal responses were prioritized over Hispanic origin responses.

2020 Census

- Up to six write-in responses and 200 characters were coded per write in line.
- There was no prioritization of responses, all responses were treated equally.

2010 Census Data Collection Operation Captured Up to 30 Characters and Coded Up to Two Groups

MEXICAN AMERICAN INDIAN AND PORTUGUESE AND AFRICAN AMERICAN

2020 Census Data Collection Operation Captured Up to 200 Characters and Coded Up to Six Groups

MEXICAN AMERICAN INDIAN AND PORTUGUESE AND AFRICAN AMERICAN

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Improvements for 2020 Census Hispanic Origin and Race Code List

2010 Census

- Used two separate code lists for race and Hispanic origin.
- Race code list included limited detailed codes for White, Black, and Hispanic groups.
- Hispanic origin code list included limited detailed codes for race groups.

2020 Census

- Used one combined code list for race and Hispanic origin.
- The combined race and Hispanic origin code list included thousands of detailed codes for all race and Hispanic origin groups.

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2020 Census Improvements to Collect, Code, and Tabulate Detailed Race Ethnicity Data

Excerpt from 2020 Census Race Ethnicity Code List: Detailed MENA Codes

MIDDLE EASTERN AND NORTH AFRICAN	7000-7499
Middle Eastern or North African	**7000-7009**
Middle Eastern or North African (Write-in)	7001
Algerian	**7010-7019**
Algerian	7010
Arab	**7020-7029**
Arab	7020
Assyrian	**7030-7039**
Assyrian	7030
Bahraini	**7040-7049**
Bahraini	7040
Berber	**7050-7059**
Berber	7050
Chaldean	**7060-7069**
Chaldean	7060
Egyptian	**7070-7079**
Egyptian	7071
Copt	7072
Emirati	**7080-7089**
Emirati	7080
Iranian	**7090-7099**
Iranian	7091
Iraqi	**7100-7109**
Iraqi	7100
Israeli	**7110-7119**
Israeli	7111

F-40

Hispanic Origin and Race Code List
2020 Census State Redistricting (Public Law 94-171) Summary File
U.S. Census Bureau

Jordanian	**7120-7129**
Jordanian	7120
Kurdish	**7130-7139**
Kurdish	7130
Kuwaiti	**7140-7149**
Kuwaiti	7140
Lebanese	**7150-7159**
Lebanese	7151
Libyan	**7160-7169**
Libyan	7160
Middle Eastern	**7170-7179**
Middle Eastern	7170
Moroccan	**7180-7189**
Moroccan	7181
North African	**7190-7199**
North African	7190
Omani	**7200-7209**
Omani	7200
Palestinian	**7210-7219**
Palestinian	7210
Qatari	**7220-7229**
Qatari	7220
Saudi	**7230-7239**
Saudi	7230
Syriac	**7240-7249**
Syriac	7240
Syrian	**7250-7259**
Syrian	7251
Tunisian	**7260-7269**
Tunisian	7260
Yazidi	**7270-7279**
Yazidi	7270
Yemeni	**7280-7289**
Yemeni	7280
Other Middle Eastern or North African Responses	**7290-7399**
Middle Eastern or North African Responses, Not Elsewhere Classified	7399

Source: 2020 Census State Redistricting Data (Public Law 94-171) Summary File: Technical Documentation, Appendix F

Improvements to the 2020 Census
Separate Question Designs,
Data Processing, and Coding Procedures

2020 Census: Two Separate Questions Design

We made improvements to question designs, data processing, and coding within the two separate questions design

Elicited much more reporting of detailed racial and ethnic identities
   55 million write-ins in 2010 Census
   350 million write-ins in 2020 Census

2020 Census Data Products – Race and Ethnicity

Released

Upcoming Releases

**Redistricting File
(Public Law 94-171)**
*Released on
August 12, 2021 and
September 16, 2021*

This product provides population counts and data on the voting age population for major race and ethnic groups.

Demographic Profile
and
Demographic and Housing Characteristics File (DHC)
Released on May 25, 2023

These products provide demographic and housing characteristics for the major race and ethnic groups.

Detailed DHC-A
Released on September 21, 2023

Detailed DHC-B
Planned Release: September 2024

Supplemental DHC (S-DHC)
Planned Release: September 2024

The Detailed DHC-A and Detailed DHC-B are the successors to the Summary File 2 and the American Indian and Alaska Native Summary Files. They provide data for disaggregated race and ethnic groups and AIAN tribes and villages.

**Redistricting File
(Public Law 94-171)**
*Released on
August 12, 2021 and
September 16, 2021*

Demographic Profile
and
**Demographic and
Housing Characteristics
File (DHC)**
Released on May 25, 2023

Detailed DHC-A
Released on September 21, 2023

Detailed DHC-B
*Planned Release:
September 2024*

Supplemental DHC
*Planned Release:
September 2024*

United States® Census Bureau

2020 Census Detailed DHC-A

- Subjects repeated for 300 detailed racial and ethnic groups and 1,187 detailed American Indian and Alaska Native (AIAN) tribes and villages:
  - Total population
  - Sex by age for selected age categories

- Geographic levels included:
  - Nation
  - States
  - Counties
  - Tracts
  - Places
  - American Indian/Alaska Native/Native Hawaiian (AIANNH) areas

- Uses an adaptive design that allows us to provide more detailed statistics for racial and ethnic groups with larger populations, while at the same time ensuring sufficient confidentiality protections.

- Released: September 21, 2023

2017-2021 ACS 5-Year Selected Population Tables and AIAN Tables (SPTs and AIANTs)

- Provides detailed statistics on social, economic, housing and demographic characteristics for hundreds of race, tribal, Hispanic origin, and ancestry for numerous geographic levels.

- Available every five years

- Over 250 iterated tables

- Recent release includes 2017-2021 5-year data

An Overview of the Population Estimates Program

October 17, 2023
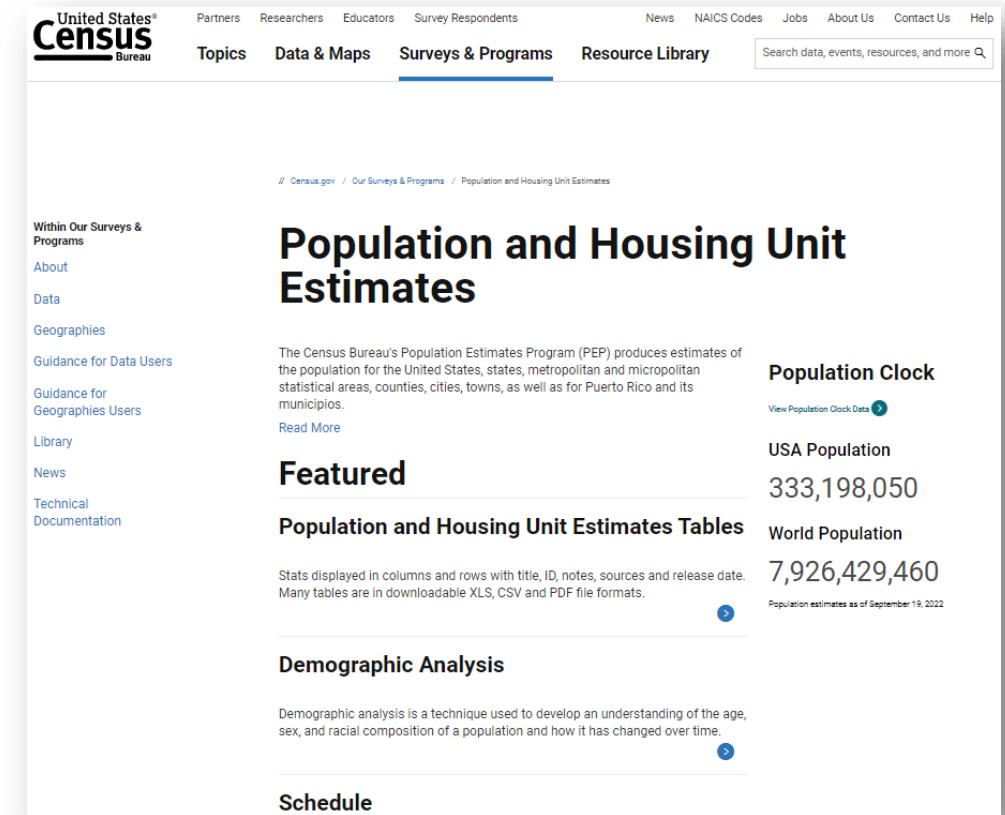
Christine Hartley
Assistant Division Chief for Estimates and Projections, Population Division

Population Estimates
The Population Estimates Program

- The Population Estimates Program (PEP) disseminates official measures of population and housing units between decennial censuses

- Mandated by federal law

- Use cases include:
  - Population controls and denominators
  - Academic and business research
  - Program planning in the public and private sectors

- Time series are released annually featuring data for the date of the last census through the vintage year, which represents the latest year of estimates available

- Current estimates series is Vintage 2022 (April 1, 2020 to July 1, 2022)

Population Estimates
PEP Estimates Geographies

Nation

Regions and Divisions

States

Metropolitan and
Micropolitan Statistical Areas

Counties

Incorporated Places (Cities)

Minor Civil Divisions (Towns)

Puerto Rico Commonwealth

Puerto Rico Municipios

80,000+ Geographic Areas / 40,000+ Communities

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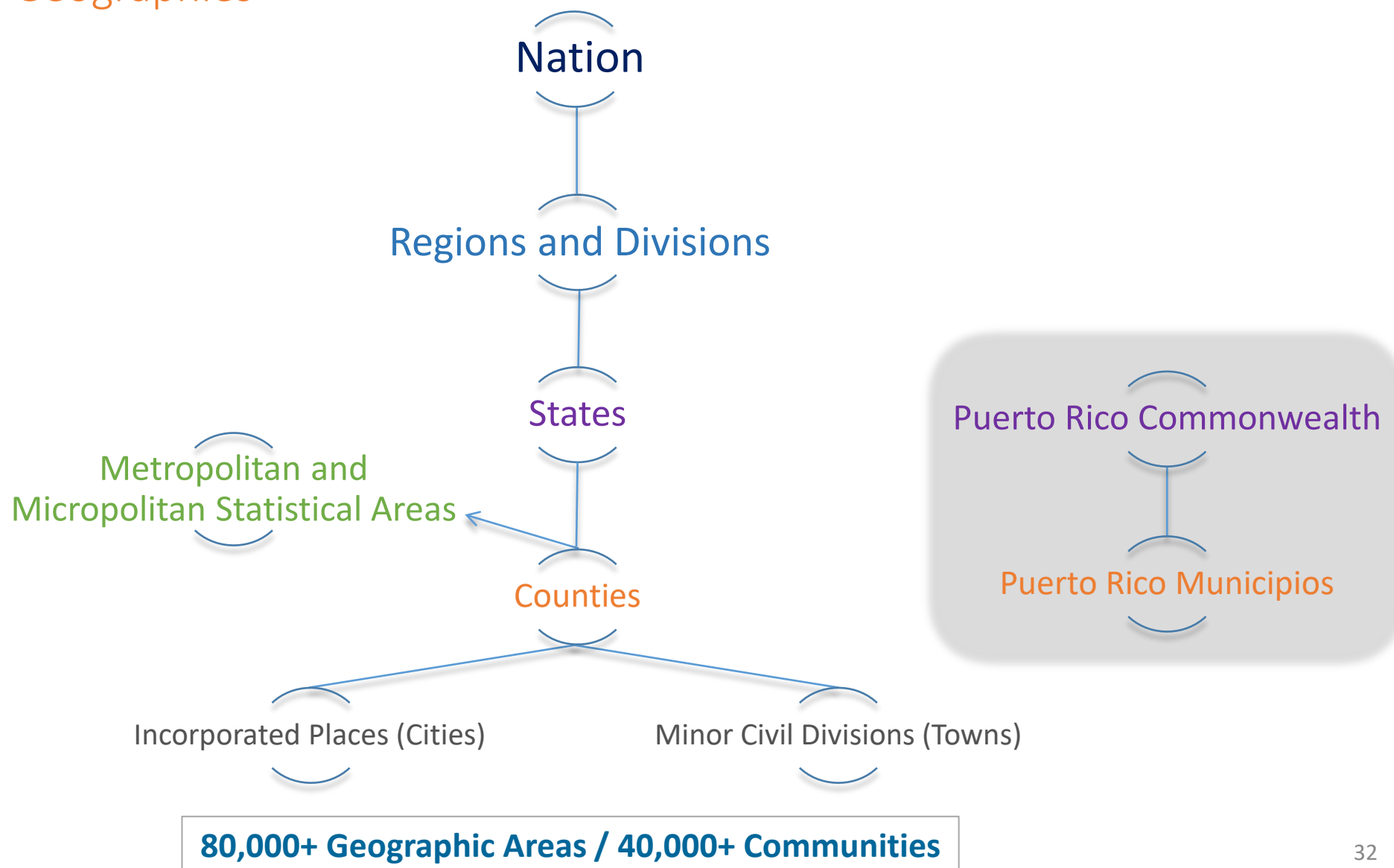
Population Estimates
Availability of Population and Housing Unit Data Products: Vintage 2023

Release Date*	Product	Geography
December 2023	Population totals, components of change, and voting-age population	Nation, states, and Puerto Rico Commonwealth
March 2024	Population totals and components of change	Metropolitan and micropolitan statistical areas, counties, and Puerto Rico municipios
April 2024	Population by age and sex	Nation
May 2024	Population totals--	Cities and towns (incorporated places, minor civil divisions)
	Housing unit totals--	Nation, states, and counties
June 2024	Population by age, sex, race, and Hispanic origin--	Nation, states, and counties
	Population by age and sex--	Metropolitan and micropolitan statistical areas, Puerto Rico Commonwealth and municipios

*Dates subject to change.

census.gov/programs-surveys/popest/about/schedule.html

Population Estimates
National, State, and County Estimates:
Cohort-Component Method

Population Base	+	Births	−	Deaths	+	Net Migration	=	Population Estimate

- Cohort-component method measures population change since the last census using the most current administrative records on births, deaths, and migration
- Population base represents the date of the latest decennial census

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Population Estimates

Housing Unit Estimates:
Components of Change Method

Housing Unit Base	**+**	New Residential Construction	**+**	New Mobile Homes	**−**	Housing Units Lost	**=**	Housing Unit Estimate
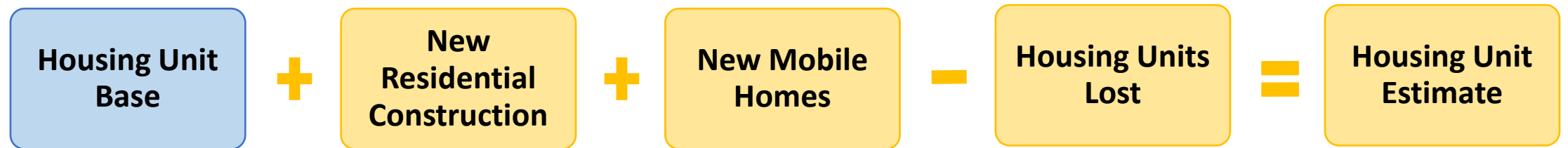
- Components of change method measures changes to the housing stock since the last census using a variety of survey and administrative data

- Housing unit base is created from invariant 2020 Census housing unit counts

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Population Estimates
Subcounty Population Estimates:
Distributive Housing Unit Method

Initial Household Population Estimate	=	**Housing Unit Estimate**	×	**Household Population from Base**	÷	**Housing Units from Base**	

Resident Population Estimate	=	**Initial Household Population Estimate**	×	**County Household Rake Factor**	+	**Group Quarters Population from Base**	

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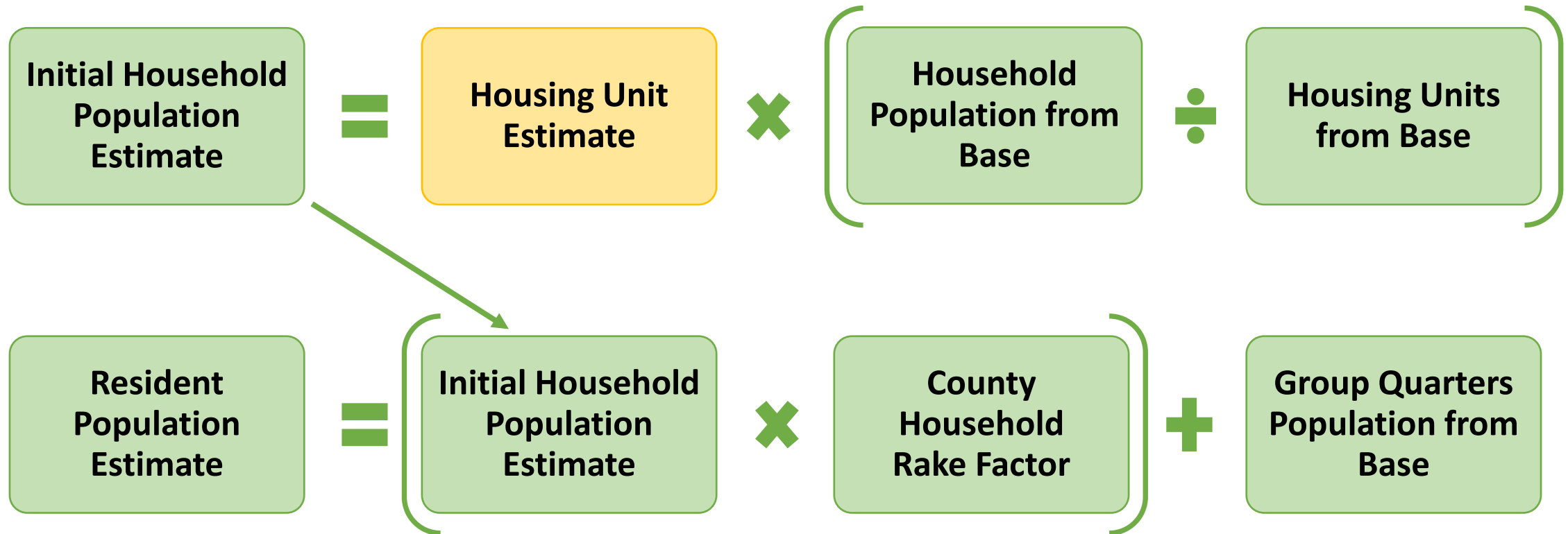
Population Estimates
Annual Updates to the Estimates

- <u>Base population updates</u>: Legal boundary changes and other geographic updates, outcomes from official census programs (e.g. Count Question Resolution), changes to the methods of estimating the base

- <u>Revisions to the components of change</u>: Incorporation of more recent and/or complete data, changes to the methods of estimating the components of population change and special population stock estimates used in the estimates process

- <u>Changes to the method of estimating population</u>: Revisions to the method of estimating population using the components of change and special population stock estimates

Blended Base Approach

Vintage 2021 Blended Base, Base Inputs, and 2020 Census Data by Sex for Ages 0-84: April 1, 2020

Note: These 2020 Census data by age and sex represent a special tabulation of the 2020 Census with confidentiality protections applied using the 2020 Census Disclosure Avoidance System.
The U.S. Census Bureau reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied to this release.
(DRB clearance number CB-FY22-DSEP-001.)
Source: U.S. Census Bureau, 2020 Decennial Census; 2020 Demographic Analysis; Vintage 2020 and 2021 Population Estimates.

Vintage 2021 Blended Base, Base Inputs, and 2020 Census Data by Sex for Ages 0-84: April 1, 2020

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Source: U.S. Census Bureau, 2020 Decennial Census; 2020 Demographic Analysis; Vintage 2020 and 2021 Population Estimates.

Population Estimates
Updates to the Blended Base for Vintage 2022

- Features processing improvements

- Expands use of 2020 Demographic Analysis data from ages 0-85+ to 0-100+

- Incorporates additional 2020 Census data by universe (aggregated noisy subcounty data for the household and group quarters populations)

- Incorporates geographic changes, including new Connecticut county equivalents

Population Estimates
The Base Evaluation and Research Team (BERT)

- BERT is made up of subject-matter experts in the areas of
  - Population estimates
  - Age and sex statistics
  - Coverage measurement
  - Race and ethnicity
  - Demography
  - Disclosure avoidance
- Findings from BERT research will inform decisions about what 2020 Census data are used in the blended base
- BERT hopes to begin sharing results with the public over the next month
- Contingent on the findings, Vintage 2023 is the first opportunity to implement any recommendations

Preliminary Findings

Age Heaping in the 2020 Census Demographic and Housing Characteristics File (DHC)

May 25, 2023

While age heaping is an issue in all decennial census and household survey data, the 2020 Census shows patterns of age heaping that are more pronounced.

Written by: Eric Jensen, Senior Advisor for Population Estimates and Coverage Measurement;
Andrew Roberts, Chief of the Sex and Age Statistics Branch;
Luke Rogers, Senior Advisor for Estimates Development and Improvement

https://www.census.gov/newsroom/blogs/random-samplings/2023/05/age-heaping-2020-census-dhc.html

Population Estimates
Beyond Vintage 2022

- Investigating ways to implement research findings from BERT is a major focus for Vintage 2023 and beyond

- Implementation of adjustments from year to year is dependent on the PEP production schedule

- This research is a priority among Census leadership

- Thoughtful, methodologically-sound solutions take time and resources, but we are committed to perpetual improvement and innovation

American Community Survey

October 17, 2023

Nicole Scanniello
Assistant Division Chief for Communications, American Community Survey Office

The American Community Survey
The Foundation

The American Community Survey is on the leading edge of survey design, continuous improvement, and data quality

- The nation's most current, reliable, and accessible data source for local statistics on critical planning topics such as age, children, veterans, commuting, education, income, and employment

- Surveys **3.5 million** addresses and helps inform how trillions of dollars in federal funds are distributed each year

- Covers **40+ topics**, supports over **300** evidence-based federal government uses

- Three key annual data releases:

  - 1-year Estimates (for large populations, geographies of 65,000+ population)

  - 1-year Supplemental Estimates (for small populations, geographies of 20,000+ population)

  - 5-year Estimates (for very small populations, geographies down to Census Tracts and Block Groups)

The American Community Survey
Impact of Data Collection Challenges on the 2020 ACS 1-Year Data

- The ACS encountered data collection challenges in 2020 due to the COVID-19 pandemic

- Given the limitations in our data collection for the 2020 ACS, we were unable to collect information from certain segments of the population

- As a result, significant nonresponse bias was present in the collected data

- While all surveys have nonresponse bias, our standard methods for mitigating the nonresponse bias were insufficient for that data year

- We released a set of experimental estimates in 2020, rather than the standard ACS 1-year estimates. We also released a set of Public Use Microdata Sample files with experimental weights

- An analytical report, *An Assessment of the COVID-19 Pandemic's Impact on the 2020 ACS 1-Year Data*, with more information on the 2020 ACS 1-year data and related quality metrics was released on October 27, 2021

census.gov/library/working-papers/2021/acs/2021_CensusBureau_01.html

The American Community Survey
2020 ACS 1-Year Experimental Data Products

- **Data tables**
  - 54 tables, similar in format to the ACS 1-year Supplemental Tables, covering social, economic, housing, and demographic characteristics
  - Available for the nation, states, and the District of Columbia

- **Technical working paper**, *Addressing Nonresponse Bias in the American Community Survey During the Pandemic Using Administrative Data*, explaining the experimental weighting methodology with an accompanying blog and appendix tables

- **Public Use Microdata Sample (PUMS) Files** with experimental weights
  - Available for nation, divisions, states, and Public Use Microdata Areas (PUMAs)

- All experimental products can be accessed from the Experimental Data web page on the ACS website
  - Not on data.census.gov or the API

census.gov/programs-surveys/acs/data/experimental-data.html

The American Community Survey
Guidance for Data Users Regarding the 2020 ACS 1-Year Experimental Estimates

- The Census Bureau encourages data users to determine whether the data are suitable for their particular use

- The Census Bureau does not recommend comparing:

  - The 2020 ACS 1-year experimental estimates with standard ACS estimates or the decennial census

  - The 2020 ACS 1-year PUMS with experimental weights with standard pre-tabulated products or PUMS-based estimates from other years

- Experimental data should be used with caution because they may not meet all our quality standards

- Estimates for PUMAs should be used with caution because the experimental weights were not optimized to produce estimates for those areas

The American Community Survey
Population Controls for the 2021 ACS 1-Year

- ACS data are controlled so that the number of housing units and people in certain categories are consistent with the Census Bureau's official estimates from the Population Estimates Program (PEP)

- Due to delays in the 2020 Census processing:
  - 2010 to 2020 intercensal estimates were not released in 2021 as planned
  - Vintage 2021 postcensal estimates could not be produced with the standard methodology and thus were not fully informed by the 2020 Census

- The 2021 ACS data products used the Vintage 2021 "Blended Base" population estimates

- In the Blended Base at the national level, population totals come from the decennial census, age and sex detail comes from DA, and race and Hispanic origin detail comes from the Vintage 2020 estimates

census.gov/programs-surveys/acs/technical-documentation/user-notes/2022-10.html

The American Community Survey
Population Controls for the ACS 5-Year

- The population controls for the ACS 5-year product are the average of the population estimates across the 5-year period

- In most years, the ACS simply uses the latest release of postcensal estimates, which are produced for the most recent census forward, for each of the five years

- If the period straddles a decennial year, then the intercensal estimates are used for years prior to the decennial and the postcensal estimates are used for the decennial year forward

The American Community Survey
Population Controls for the 2017-2021 ACS 5-Year

For the 2017-2021 ACS 5-year, given that the intercensal estimates were not available we used the Vintage 2020 postcensal estimates for the years prior to 2020 but they were internally adjusted to be consistent with the Vintage 2021 blended base estimates.

What we planned to do:

2017, 2018, 2019, 2020, 2021

Intercensal Estimates informed by 2010 and 2020 Census

Postcensal Estimates informed by 2020 Census

What we did:

2017, 2018, 2019, 2020, 2021

Adjusted Vintage 2020 estimates

Vintage 2021 population estimates informed by 2020 Census
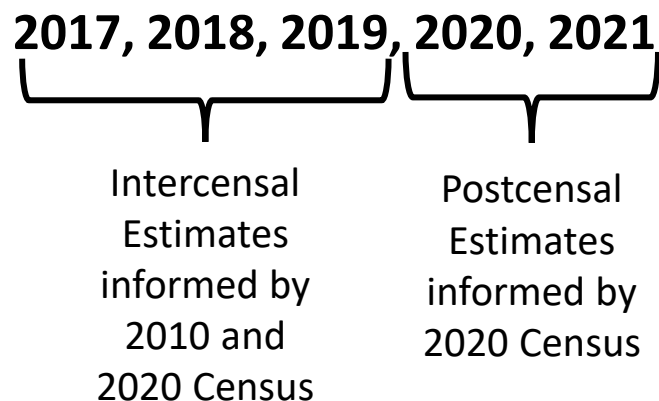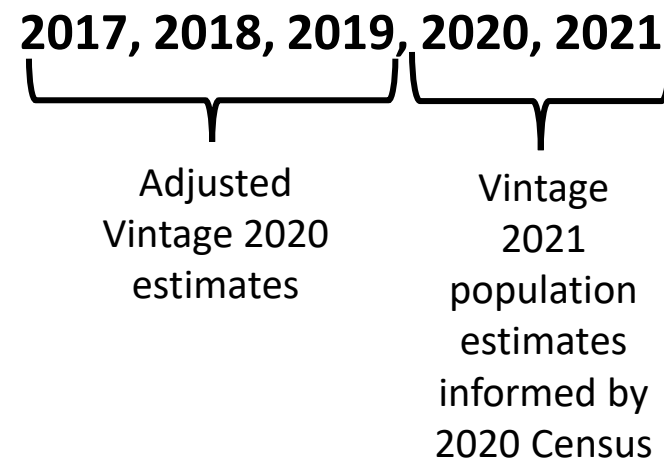
The American Community Survey
ACS Geography Changes

- Boundary changes typically occur due to annexation, disincorporation, and geocoding updates

- Most ACS geographies reflect the 2020 Census boundary changes
    - New 2020 Census tract definitions and census designated places updated in the 2016-2020 ACS 5-year
    - Zip Code Tabulation Areas (ZCTAs) updated with 2020 Census Boundaries in the 2017-2021 ACS 5-year

- Upcoming geography changes for the 2022 ACS data releases:
    - 2020 based Public Use Microdata Sample Areas (PUMAs) and Urban Areas
    - 118th Congress and 2022 State Legislative District Boundaries
    - Connecticut counties replaced with 9 planning zones
    - Change to Vermont School District Boundaries

census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes.html

The American Community Survey
Comparison Guidance

Do	Do Not
Use ACS for population characteristics (i.e., percents, means, medians, rates)	Use ACS for population totals (instead use decennial census or the Population Estimates Program)
Compare similar period lengths (i.e., 1-year to 1-year and 5-year to 5-year)	Compare estimates from different period lengths (i.e., 1-year to 5-year)
Conduct statistical testing when making comparisons between estimates	Look at estimates alone to decide if they are higher or lower than one another
Compare across geographies and population subgroups using 2022 ACS	Expect ACS estimates to match decennial census counts or estimates from other surveys

census.gov/programs-surveys/acs/guidance/comparing-acs-data.html

The American Community Survey
Geography Boundaries by Year

Geography Boundaries by Year

Vintage of Geographic Areas for ACS Estimates

The ACS typically publishes estimates using the latest available geographic boundaries (also known as "vintages"). For ACS 5-year estimates, use the last year of the estimate period to determine the vintage. For example, the following datasets use the same vintages of geographic boundaries:

- 2020 ACS 1-year estimates
- 2016-2020 ACS 5-year estimates

To learn more about geographic concepts used in the ACS, check out our geographic handbook Geography and the American Community Survey: What Data Users Need to Know.

2020 2019 2018 2017 2016 2015 2014 2013 **MORE** ⌄

2020

- Legal Areas
- Statistical Areas

Legal Areas

Legally defined geographic areas used in the ACS are updated on an annual basis from a variety of programs, including: the Boundary and Annexation Survey (BAS), the Redistricting Data Program and the School District Review Program.

Summary Level	Geographic Area	Vintage of Geographic Area for 2020 ACS Estimate Year
040	State and State Equivalent	January 1, 2020

census.gov/programs-surveys/acs/geography-acs/geography-boundaries-by-year.html

The American Community Survey
Comparison Guidance

The American Community Survey
Data User Resources

census.gov/programs-surveys/acs/guidance.html

The American Community Survey
Technical Documentation

census.gov/programs-surveys/acs/technical-documentation.html

Disclosure Avoidance

October 17, 2023

Michael Hawes
Senior Survey Statistician for Scientific Communication,
Research and Methodology Directorate

Keeping the Public's Trust: Title 13

"To stimulate public cooperation necessary for an accurate census…Congress has provided assurances that information furnished by individuals is to be treated as confidential. **Title 13 U.S.C. §§ 8(b) and 9(a)** *explicitly provide for nondisclosure of certain census data, and* **no discretion is provided to the Census Bureau on whether or not to disclose such data***…"* (U.S. Supreme Court, Baldrige v. Shapiro, 1982)
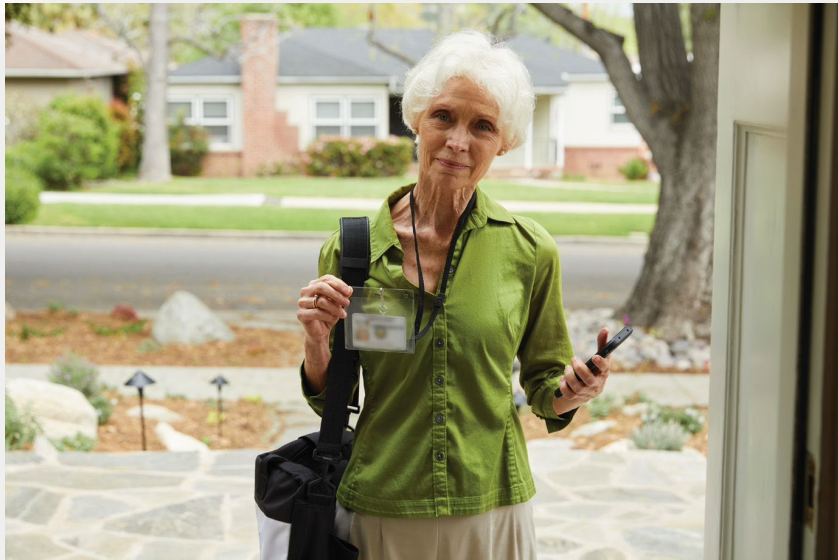
To safeguard the public's confidential census responses, the Census Bureau has long employed a variety of statistical techniques to mitigate disclosure risk in our published data products.

United States® Census Bureau

Disclosure Avoidance for Past Censuses
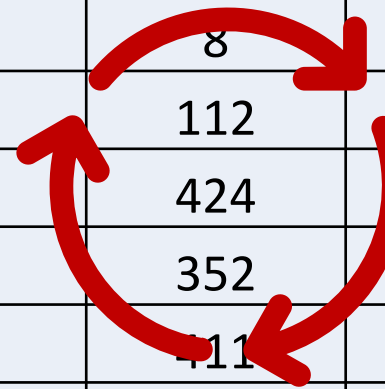
1970-1980 Censuses

	528	
		794
	581	
137	941	189
931		
	250	
		590

SUPPRESSION

1990-2010 Censuses

668	178	779
91	8	159
809	112	811
518	424	955
989	352	765
237	111	686
77	820	590

SWAPPING

The Ever-rising Risk of Disclosure

- Any data release carries some risk of disclosure.

- Improvements in computing power and the explosion of third-party data mean that disclosure risk has increased significantly.

- Protecting confidentiality means adapting and responding to these increasing threats

Disclosure Avoidance for the 2020 Census

The 2020 Census improves on the noise injection methods of the 1990-2010 Censuses by employing a mathematical framework known as Differential Privacy (DP) to assess and quantify disclosure risk and confidentiality protection.

Every individual that is reflected in a particular statistic contributes towards that statistic's value.

Every statistic that you publish "leaks" a small amount of private information.

DP as a framework allows you to assess each individual's contribution to the statistic, and to measure (and thus, limit) how much information about them will leak.

The 2020 Census Disclosure Avoidance System

TopDown Algorithm (TDA)

Produces privacy-protected microdata (Microdata Detail File) that can be ingested by Decennial tabulation systems

- P.L. 94-171 Redistricting Data Summary File
- Demographic Profile
- Demographic and Housing Characteristics File (DHC)

SafeTab PHSafe

Produce privacy-protected tabulations directly

- Detailed DHC-A
- Detailed DHC-B
- Supplemental DHC

The TopDown Algorithm

| Input Microdata (CEF) & Tabulation Geographic Reference File (Tab GRF-C) | Conversion to Histogram | Noisy Measurements | Post-processing | Conversion to Microdata (MDF) |

For complete details see: Abowd, J., Ashmead, R., Cumings-Menon, R., Garfinkel, S., Heineck, M., Heiss, C., Johns, R., Kifer, D., Leclerc, P., Machanavajjhala, A., Moran, B., Sexton, W., Spence, M., & Zhuravlev, P. (2022). The 2020 Census Disclosure Avoidance System TopDown Algorithm. *Harvard Data Science Review*. (June) https://doi.org/10.1162/99608f92.529e3cb9

Assessing Fitness for Use

Components of the 2010 Demonstration Data Product Suite

- 2010 DDPS Fact Sheet

- Detailed Summary Metrics (and Metrics Overview)

- Privacy-Protected Microdata File (PPMF)

- DHC Tabulations (via IPUMS)

- Privacy-loss Budget (PLB) Allocations

- Noisy Measurement File (NMF)

2020 Accuracy Measures

Direct comparisons of the 2020 Census DHC to the 2020 Census Edited File (CEF)

Available at: https://www2.census.gov/programs-surveys/decennial/2020/data/demographic-and-housing-characteristics-file/2020-Census-Disclosure-Avoidance-System-Detailed-Summary-Metrics.xlsx

Reader-Friendly Disclosure Avoidance Briefs

- [Disclosure Avoidance and the 2020 Redistricting Data](#)

- [Why the Census Bureau Chose Differential Privacy](#)

- [Disclosure Avoidance and the 2020 Census: How the TopDown Algorithm Works](#)

More resources are in development, as well as additional specific guidance and training for using the 2020 Census data.

Thank You!

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